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American corporations should aim their operations at the economic and commercial spheres and not the political.

We strongly feel that corporations should serve strictly commercial purposes and that it would contravene their role in society to be used as instruments for political activity.

The reasons for keeping organizations out of politics are well known to managers in the 135 countries and territories where the Company's subsidiaries and affiliates are engaged in business. If these subsidiaries and affiliates were to engage in politics, it is highly probable that many of their respective governments would cause them to cease operations within their borders.

While Texaco subsidiaries and affiliates must abide by the laws of the country or territory in which they operate, this does not imply agreement with such laws.

If self-determination and independence are the issues in Angola, these are clearly political issues. The proper channel for representations to the Portuguese government by Americans concerned with this issue is through the United States Government. Through its Ambassador to Portugal and its Representative at the United Nations, the United States Government is in a position to make known the views of its citizens. Withdrawal from Angola by Texaco, in the opinion of Texaco management, could be harmful to the people of these areas as well as to the interests of Texaco stockholders. It would endanger the jobs of the people employed by Texaco in these areas. Texaco continues to believe it can perform its most useful function by concentrating on its business, complying with local laws, living up to obligations, staying out of politics, and assisting in the economic advancement of peoples throughout the world by providing energy supplies essential to improving standards of life.

As in South Africa, Texaco has functioned in a creditable manner in Angola. It has demonstrated that it can bring and is bringing improvements to the lives of both white and non-white employes. Texaco should be given due credit for these past accomplishments, and should be encouraged by its stockholders to continue its good work in the years ahead.

Marketing Operations

Texaco petroleum products have been marketed in Angola for more than 40 years. During 1973 Texaco Africa Ltd., a wholly owned subsidiary of Texaco Inc., terminated its exclusive agency agreement with the trading firm Robert Hudson & Sons, and commenced direct marketing in Angola with an additional 35 employes.

Currently, Texaco lubricants are imported, and refined products are purchased from Petrangol's refinery located in Luanda. Petrangol is owned 85 percent by Petrofina and 15 percent by the government of Angola. The refinery cannot manufacture the country's total requirements; therefore, it is anticipated that some refined products must be imported during 1974.

Texaco Africa Ltd., Angola Branch, employs over 125 national employes and does not practice discrimination of any kind in its employment practices.

During 1973 Texaco sold some 806,000 barrels of petroleum products and similar sales volumes are forecast for 1974. Sales are realized largely through a network of 71 company-owned or financed, dealer-operated service stations and 54 other resale outlets. Texaco's overall market position in Angola is approximately 10 percent.

Texaco Export Inc. imports gas oil into Mocamedes, Angola, for international marine bunker customers. Texaco Africa Ltd. performs bunkering operations for these sales.

The company owns and operates one ocean terminal and four bulk depots. Bulk products are transported in 10 company-owned railroad tank cars and in third-party tank trucks.

Texaco's property, plant, and equipment investments in Angola marketing operations at December 31, 1973, were as follows:

At Cost	$5,422,745
Less Depreciation Reserve	2,198,354
Net Cost	$3,224,391

Exploration and Producing Operations

Texaco Petroleos de Angola S.A.R.L., a 100 percent Texaco-owned subsidiary, currently participates in two license areas in Angola. One of the licenses, referred to as "the three-party agreement," covers an area onshore and offshore comprising about 1.29 million acres. Texaco holds a 25-percent interest in this license area, with the remaining interest being held by two Portuguese companies. Petrangol, which holds a 50-percent interest and is the operator for the onshore portion, is owned 85 percent by Petrofina and 15 percent by the government of Angola. The other Portuguese company, which holds a 25-percent interest in the license, is Angol, a company owned 40 percent by Sacor, 30 percent by Banco Borges and Irmao, and 30 percent by private Portuguese stockholders.

Exploration has been conducted in the onshore portion of the license area since 1968, when Texaco's exploration rights were first granted. A moderately extensive program of seismic surveying and/or wildcat drilling has been carried out each year. Seventeen wildcat wells have been drilled in the area and three of these have resulted in the discovery of small oil fields that are being developed with field wells. Additional seismic surveying and drilling are currently under way onshore and will continue onshore at the Quinguila, Cabeca da Cobra, and N'Zombo Fields, whose production rates are now running at 5,900 barrels a day, 910 barrels a day, and 6,500 barrels a day respectively. One unsuccessful wildcat well has been drilled on the offshore portion of the three-party license area, where Texaco is the operator.

The second license, covering the so-called "two-party area," is one in which Texaco holds a 50-percent interest granted in 1969 and is the operator. The other 50-percent interest is held by the same Portuguese company, Angol, that holds an interest in the three-party area. This area, comprising 1.60 million acres all located offshore, has undergone extensive seismic work, and two wildcats have been drilled. One of the wells was a dry hole and the other found noncommercial gas zones. Additional seismic surveying and drilling are scheduled to continue throughout 1974.

Upon execution of the 1968 and 1969 agreements, a $3.5-million signature bonus was paid by Texaco to Angol, from which it acquired its participating interests. Current production totals slightly in excess of 13,000 barrels a day, of which Texaco's share is 3,250 barrels a day.

A sum of $35,000 is payable yearly for each of the two areas involved into a Mining Development fund, with Texaco's share being 25 percent in one case and 50 percent in the other. The fund is devoted to scientific investigation works.

The royalty paid by Texaco to the government for the period 1972-1973 totaled slightly over $130,000. The local income tax rate is 50 percent of net profits. ☆

AR SANDS–FUTURE ENERGY SOURCE

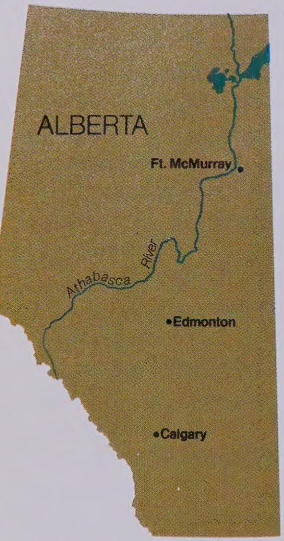
The Athabasca River originates in the Canadian Rockies as little more than a trickle from a glacier near 12,294-foot-high Mount Columbia, the highest point in Alberta. Over a 765-mile course from southwestern Alberta to Lake Athabasca, in the province's northeast corner, the river descends through the spectacular mountain scenery of Jasper National Park, then winds through forests, wheat fields, and cattle farms. Finally, the Athabasca heads through a vast area of muskeg and evergreens.

Near the center of this flat, bog-like section of Alberta— where the Athabasca meets the Clearwater River —lies the town of Fort McMurray. Located approximately 250 miles from Edmonton, Alberta's capital city, Fort McMurray was, until a few years ago, a relatively isolated fur trading center of a few hundred people. It was also a transfer point for goods shipped there by rail from Edmonton, and then by barge over the Athabasca, Slave and Mackenzie Rivers to Arctic settlements.

Today, Fort McMurray is a modern-day boom town. Some of the fur traders are still here, and so are the barge operators. Also present in ever-increasing numbers, however, are the scientists and engineers from Texaco and other energy companies who are working to unlock the secrets of recovering the potentially rich sources of energy buried in this vast wilderness area of Canada. Here, in an irregularly shaped area of 5.7 million acres is the world's largest known deposit of tar sands.

When Fort McMurray was first settled nearly 200 years ago, explorer Peter Pond noticed that the Cree Indians there used a black, oily substance oozing from

The cold beauty of a midwinter sunset in Northeastern Alberta, Canada (left), *casts a spell over the snow-covered site of the Company's experimental Athabasca tar sands project. In the normally sub-zero winter climate here, oil field workers using steam lines* (below) *maintain a 24-hour-a-day vigil to keep equipment like these expansion joints from freezing.*



the banks of the Athabasca for waterproofing canoes.

In 1897, more than a century later, the first of many unsuccessful attempts to recover the oil from what became known as the tar sands was conducted. The tar sands are actually underground seams of sand saturated with bitumen (a black, viscous, oily substance), minerals, and water.

What has been learned through these attempts is that the amounts of petroleum contained in the sands here are very substantial—perhaps amounting to some 600 billion barrels of oil. Equally substantial, however, are the difficulties involved in the development of commercially feasible means of extracting the bitumen.

One of these difficulties is economic; the cost of extracting the bitumen from the sands is such that it is not competitive with prices for conventional crude oil. More recently, however, the worldwide shortage of energy has created new interest in the tar sands.

Today, one company operates a plant near Fort McMurray that extracts 50,000 barrels per day of synthetic crude oil. In this operation, tar sand is obtained by mining. Then, hot water and steam are applied to separate the oil from the sand. The oil is called synthetic to differentiate it from conventional crude oil. Larger plants of this kind are in construction or planning stages.

Texaco researchers and producing personnel, as well as scientists at the Research Council of Alberta, however, have been working toward the development of an *in situ* process for extracting bitumen from the tar sands by separating the oil from the sand underground—then pumping the oil to the surface and leaving the sand right where it is. The Research Council provides technical assistance to industry on a contract basis.

W. A. (Bill) Gatenby, Assistant Manager of Texaco Exploration Canada Limited at the Calgary offices of the wholly owned subsidiary, explains that employes based at Fort McMurray have been working on this experimental project for the past two years. The techniques they have been evaluating involve, basically, injecting various combinations of fluids into tar sands formations to transform the highly viscous bitumen contained in the sand into a fluid that can be pumped to the surface.

The 10-acre site on which the Texaco people have been working is part of the Company's 50,000-acre Fort McMurray lease, which is located 15 miles south of the town. Other Company leases in the Athabasca tar sands area include the massive 300,000-acre Birch Hills leases, near the Athabasca River some 70 miles downstream, and the Steep Bank lease, approximately 30 miles north of Fort McMurray. The Fort McMurray lease is also within a mile of the runway of the airport here, which provides the major link with the growing cities of Edmonton and Calgary.

A visitor descending into Fort McMurray on the morning jet flight from Edmonton on a winter day, when the photos illustrating this article were made, sees miles of snow-covered flat terrain interspersed with stands of jackpine and spruce trees. Stretching across this ruggedly beautiful panorama are the two-lane provincial highway from Edmonton; the snow-plowed single track of the Northern Alberta Railways; and the straight, finely etched seismic crew trails that form crisscross patterns toward the horizon.

After the airliner touches down on the runway, it passes between two four-foot-high evergreens along the mile-long landing strip. A passenger says the trees serve as guides for the bush pilots who form a lifeline for the many isolated settlements spread over 2,000 miles from here to Arctic tundra.

The passenger is C. E. (Red) Anderson, an Assistant District Superintendent for Texaco Exploration Canada, who is responsible for field direction of the Athabasca tar sands project.

Leaving the aircraft on this brilliantly sunny morning, a visitor is impressed by the incredible brightness of the scene. Tiny crystals of snow reflect the bright sunlight. The temperature in Fort McMurray on this day is approximately minus seven degrees Fahrenheit—with the absence of a wind, it's almost comfortable. "This is practically summer weather," Red Anderson says with a smile. "Temperatures as low as minus 55 degrees aren't uncommon here in winter."

On the ride with Red Anderson from the terminal to the Texaco site, are Bill Kolodinsky, Assistant Chief Engineer for Texaco Exploration Canada, who is visiting here from Calgary today, and Wilf Alton, Production Foreman at the site.

"When we started working on the Fort McMurray lease in the summer of 1972," Bill Kolodinsky explains, "we made this three-mile ride from the airport road by swamp buggy. The terrain here is mostly muskeg," he continues. "It's a bog that's otherwise impassable unless it's frozen. That's why all road construction and site preparation are done in the winter.

"You can't move very much of the muskeg or tree cover

A department store (top left) *operated by the Hudson's Bay Company and modern housing* (top right) *are recent additions to booming Fort McMurray. On a snowy afternoon in February* (above), *students leave classes at the community's new elementary school. Curling* (left), *which resembles shuffleboard on ice, is a popular sport at the arena in Fort McMurray.*

during construction," Bill continues, "or you'll wind up with severe runoff and erosion in the spring. When we built this access road, and the site for our wells, we placed clay atop the muskeg along the right-of-way.

"Incidentally, this area could be farmed if sections were drained properly," Bill points out. "Look at those jack-pines. Where there's little water they stand 15 feet tall; where saturation is heaviest, they're a few inches high."

Rounding a bend in the road, near the facility's million-barrel water reservoir, Wilf Alton points toward some tracks in the snow off the road. "That old moose has been around again," Wilf chuckles. An energetic man with a quick smile, Wilf explains that the muskeg supports a variety of wildlife. "There's a beaver that has a dam in our reservoir back there," he says. The 800-foot-square body of water Wilf refers to supplies 3,000 barrels a day of water for operations at the site. Bill Kolodinsky explains that the lake is pumped to its 26-foot depth with water from nearby Saline Creek in late spring after fish in the creek have spawned.

One man who has been instrumental in developing the techniques being tested here is C. D. (Don) Woodward, Assistant Manager at Texaco's Research and Technical Department Laboratories in Bellaire, Texas.

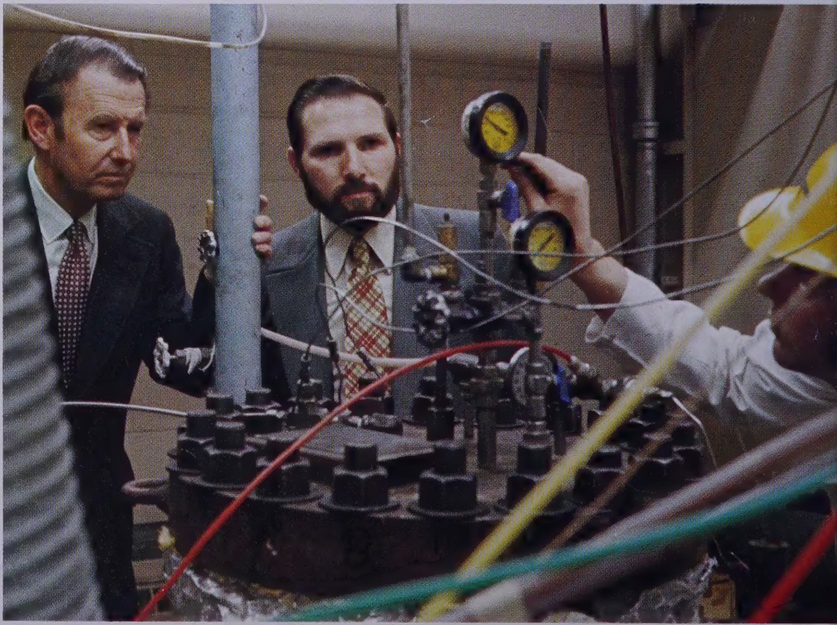
"I'm pretty sure that within a matter of time the bitumen will be produced from the tar sands using *in situ* methods," Don states. Tar sands are found in seams up to 100 feet or more thick. They are covered by an overburden of earth and muskeg that can range from perhaps 20 feet to several hundred feet. Mining operations, Don Woodward feels, are practical only to depths of about 200 feet. Most of the tar sands, he estimates, will require *in situ* methods of recovery.

"What we're trying to do here, where the seams are beyond mining depth," he explains, "is to determine the most effective means of *in situ* recovery. We're also trying to develop an understanding of the economics to evaluate techniques for commercial applications."

The men who have worked here since the first winter of 1958, when Texaco drilled core holes to determine the depth and quality of deposits, reminisce about a town of some 400 people who live in relative isolation. They talk about an ice bridge spanning the Athabasca where a half-mile-long steel bridge stands today, and about trips up the ice-covered river to Birch Hills.

And they point with pride toward the progress that has been made in the development of the tar sands as an energy source for the future. ☆

A surveyor (below) *marks a reference point during preparation of new well site at the Fort McMurray lease. An oil field worker, riding a seismic trail on a snowmobile* (right), *meets a local trapper with his dog team. Teams of seven dogs, like this one, can pull a sled and its driver more than 100 miles in a day.* Bottom: *At the Alberta Research Council in Edmonton, Dr. Alex McKay* (left), *Manager of the Research and Technical Department staff of Texaco Exploration Canada Ltd. in Calgary, and Dr. David A. Redford of the Council observe an experiment on a simulator that duplicates conditions in a tar sands formation.*



Superports: The Missin

What does Marseilles have that New Orleans hasn't? Or Genoa that Philadelphia doesn't have?

Marseilles and Genoa, like dozens of other cities outside the United States, have offshore neighbors that are good neighbors indeed not only during an energy shortage but in a time of worldwide inflation when every means of moderating prices should be brought into play.

Those neighbors are offshore deepwater ports, and they make it possible for the countries that have built them to bring mammoth tankers close to their shores and hence maximize the efficiencies and economies of importing crude oil.

A mammoth tanker of the 200,000-deadweight-ton class is capable of carrying a million and a half barrels of crude oil in a single voyage. Such tankers are often called Very Large Crude Carriers (VLCCs). Ultra Large Crude Carriers (ULCCs) exceed 300,000 deadweight tons and range to almost 500,000. VLCCs and ULCCs are vastly larger than the conventional tankers of yesterday.

Like any other commodity, it is cheaper to ship oil in large quantities than in small. A mammoth tanker can cut the delivered cost of crude oil by as much as 50 cents a barrel. That's an important statistic for the United States, which last year imported six million barrels of oil a day.

Why is the VLCC so economical? Partly because its turnaround time is not significantly different from that of a smaller tanker and it is not proportionately more expensive to man and operate.

When the per-barrel cost of transporting crude oil is reduced, the savings in transportation expense are ultimately reflected in the prices paid by customers for finished petroleum products.

And everyone is a buyer of petroleum products—either to be used as themselves, such as gasolines and heating fuels, or as ingredients in other products, as in shoe polishes and lipsticks. Every industry is a buyer of petroleum products—to use in the manufacture of its own products, or to transport them, or to heat its plants and lubricate its machinery. In short, there is no person, no industry, no country that does not stand to gain from any new efficiency and any new economy in the marine transportation of crude oil from the producing field to the refinery.

That's where VLCCs come in, and VLCCs need deepwater ports. An ordinary port won't do.

This is a reality that is understood by about 15 foreign countries in Europe, the Middle East, Asia, and th Caribbean, as well as by Canada. Those countries, wit about 100 deepwater ports among them, are currentl availing themselves fully of the efficiencies and economies of VLCCs.

By contrast, the United States Government has no authorized the construction of a single offshore termina deep enough to handle them.

Which means that any crude oil arriving in Unite States ports is unloaded from tankers that are drasticall out of scale with the energy requirements of the 1970s

Conventional tankers have been the workhorses of th petroleum industry's marine operations. But to rely o them in the late 1970s when crude oil will have to b imported in much greater volumes would mean addin so many tankers to those already in service that our seaports would be greatly overburdened and the possibilit of mishap increased.

Not to mention the expense of building smaller tanker in the numbers that would be needed, when it would b far less costly to construct proportionately fewer VLCCs

But the vital link between VLCC and shore is th superport. For the United States, that link is missing Such a situation is obviously a drawback in the midst o an energy shortage.

Alternative Energy Sources

While alternative sources of energy—such as nuclear geothermal, solar, shale oil, coal liquids, and tar sands— are being developed and their use made practical petroleum will continue to be the world's most important energy resource.

It now supplies about 78 percent of the world's energy, and that figure is not expected to change significantly for the rest of the century. By 1980 the Unite States alone will probably require nearly 21 million barrels of oil a *day.*

This means that the petroleum industry will have t produce as much crude oil as possible, as fast as possible It will have to modernize and augment present refinin capacity until finished petroleum products can be manufactured in volumes adequate to demand. And it wil have to transport the crude from producing field t refinery with maximum efficiency and economy an with minimum congestion on the seas and in ports.

All of which dictates that instead of doubling, tripling quadrupling the number of smaller tankers in ou

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